Volunteer Lake Assessment Program Individual Lake Reports

MASSASECUM, LAKE, BRADFORD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	6,044	**Max. Depth (m):**	16.4	**Flushing Rate (yr^{-1})**	2
Surface Area (Ac.):	402	**Mean Depth (m):**	3.8	**P Retention Coef:**	0.59
Shore Length (m):	6,400	**Volume (m^3):**	6,229,000	**Elevation (ft):**	631

TROPHIC CLASSIFICATION

Year	Trophic class
1987	MESOTROPHIC
2005	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

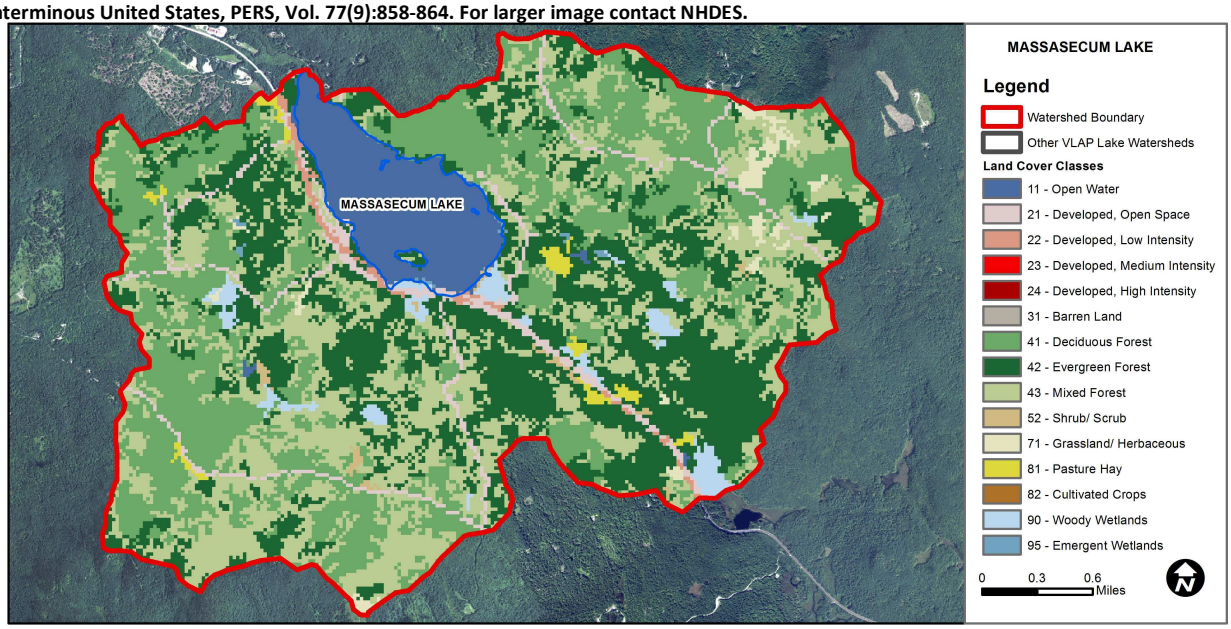
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Good	There are at least 10 samples with one, but < 10% of samples, exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LAKE MASSASECUM - CAMP PIESAULE BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
LAKE MASSASECUM - FRENCH'S PARK TOWN BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.
LAKE MASSASECUM - MASSASECUM CASINO BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	7.14	Barren Land	0	Grassland/Herbaceous	1.22
Developed-Open Space	3.22	Deciduous Forest	27.57	Pasture Hay	0.81
Developed-Low Intensity	0.67	Evergreen Forest	28.23	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	28.68	Woody Wetlands	1.96
Developed-High Intensity	0	Shrub-Scrub	0.43	Emergent Wetlands	0.13

Volunteer Lake Assessment Program Individual Lake Reports

Lake Massasecum, Bradford

2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were low and less than the state median in July. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and tributary conductivity levels, with the exception of Frenches Park Brook, were within a low to average range in July. Epilimnetic (upper water layer) conductivity was the lowest measured since monitoring began and historical trend analysis indicates highly variable epilimnetic conductivity since monitoring began. Frenches Park Brook conductivity and chloride levels were slightly elevated and greater than the state medians.
- **E. coli:** E. coli levels increased from the upstream Davis Bk. #2 station to the downstream Davis Bk. station in July following a significant rain event. This is not unusual for a wetland system as a significant rain event may flush the system and any bacteria that have accumulated from wildlife. Although E. coli levels were slightly elevated they did not exceed the state standard of 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Deep spot total phosphorus levels were very low in July and Epilimnetic phosphorus level was the lowest measured since monitoring began. Historical trend analysis indicates highly variable epilimnetic phosphorus since monitoring began. Babcock Bk., Colby Bk., Davis Bk., Howlett Bk., and Melvin Bk. Outlet phosphorus levels were within a low to average range for those stations. Frenches Park Bk. phosphorus was slightly elevated for that station and the recent significant storm event and subsequent stormwater runoff may have contributed to the elevated phosphorus.
- **Transparency:** Transparency was good in July and better than the state median. Historical trend analysis indicates stable transparency since monitoring began.
- **Turbidity:** Epilimnetic and metalimnetic (middle water layer) turbidities were low in July. Hypolimnetic (lower water layer) turbidity was slightly higher but within an average range for that station. Tributary turbidities were low with the exception of Davis Bk. with a slightly higher turbidity after significant storm event flushed the wetland system.
- **pH:** Epilimnetic pH was within the desirable range 6.5-8.0 units however metalimnetic and hypolimnetic pH levels were less than desirable. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years. Davis Bk. pH levels were also low due to the wetland influences.
- **Recommended Actions:** Increase monitoring frequency to three times per summer to better assess seasonal and historical trends and decrease variability in the data. Investigate potential sources of elevated phosphorus, conductivity and chloride in Frenches Park Bk. by conducting bracket sampling and stormwater sampling of the stream. Contact the VLAP Coordinator if you would like assistance with stream stormwater and bracket sampling. The stable water quality trends are a great sign; keep up the great work!

Table 1. 2014 Average Water Quality Data for MASSASECUM LAKE

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	3.5	2.93		20.6		3	5.50	6.00	0.48	6.75
Metalimnion				41.2		5			0.87	6.03
Hypolimnion				43.1		9			2.58	6.08
Babcook Brook				34.1		11			0.39	6.58
Colby Brook				23.9		16			0.58	6.9
Davis Brook				57.7	300	24			1.52	5.94
Davis Brook #2					180					
Frenches Park Brook			23	116.6		20			0.72	6.75
Howlett Brook				27.8		15			0.46	6.64
Melvin Bk Outlet				41.4		6			0.66	6.69

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.